# MBC40 Series

## AC-DC Open Frame Power Supplies
## Medical

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Please refer to exact equivalent product series
**MWLT40**

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The MBC40 Series of open-frame medical power supplies, with its wide universal 90-264 VAC input range, is available at 40 W of output power and a variety of single and multiple output voltages.

The MBC series is designed and approved to the latest Medical standards (EN/IEC 60601-1), providing 2 x MOPP isolation for Class I & Class II applications.

These medical power supplies are ideal for, monitoring, home health equipment as well as surgical devices.

RoHS Compliant

### Key Features & Benefits

- 4 x 2 x 1.2 Inch Form Factor
- Single to Triple Outputs
- Ultra High Efficiency > 85%
- Approved to EN/IEC 60601-1
- Low leakage current < 250 µA
- No Load Power < 0.3 W
- IEC Protection Class Options:
  - Class I: Earth pin J4 (no suffix)
  - Class II: No Earth pin (-2 suffix)
- RoHS Compliant
- Cover Kit Accessory Available

### Applications

- Dialysis
- Monitoring
- Pumps
- Surgical Devices
- Home Health
- Ultrasound



Please read our datasheet & drawing disclaimer here.

## 1. MODEL SELECTION

| MODEL [1] | VOLTAGE | MAX LOAD [2] | MIN LOAD [3] | RIPPLE [4] | POWER |
|---|---|---|---|---|---|
| MBC40-1005G | 5.1 V | 8.0 A | 0.0 A | 1% | 40 W |
| MBC40-1012G | 12 V | 3.5 A | 0.0 A | 1% | 40 W |
| MBC40-1015G | 15 V | 2.7 A | 0.0 A | 1% | 40 W |
| MBC40-1024G | 24 V | 1.7 A | 0.0 A | 1% | 40 W |
| MBC40-1048G | 48 V | 0.83 A | 0.0 A | 1% | 40 W |
| MBC40-3000G | $V_1$ = 5.2 V<br>$V_2$ = 12.5 V<br>$V_3$ = -12.8 V | 6.0 A<br>2.0 A<br>0.5 A | 0.5 A<br>0.1 A<br>0.0 A | 1.5%<br>1%<br>1% | 40 W |
| MBC40-3001G | $V_1$ = 5.2 V<br>$V_2$ = 24 V<br>$V_3$ = -12.8 V | 6.0 A<br>1.0 A<br>0.5 A | 0.5 A<br>0.1 A<br>0.0 A | 1.5%<br>1%<br>1% | 40 W |
| MBC40-3002G | $V_1$ = 5.2 V<br>$V_2$ = 15 V<br>$V_3$ = -15 V | 6.0 A<br>1.5 A<br>0.5 A | 0.5 A<br>0.1 A<br>0.0 A | 1.5%<br>1%<br>1% | 40 W |
| MBC40-3003G | $V_1$ = 3.3 V<br>$V_2$ = 5 V<br>$V_3$ = -12.8 V | 6.0 A<br>3.0 A<br>0.5 A | 1.0 A<br>0.1 A<br>0.0 A | 1.5%<br>1.5%<br>1% | 40 W |
| COVER-40-XBC [5] | Metal cover kit accessory | | | | |

1 Class II version available. Add suffix "-2" at the end of the Model Number
2 Maximum current per output channel. Do not exceed total output power rating.
3 Min Load specified to meet cross regulation.
4 Ripple is peak to peak with 20 MHz bandwidth and 10 µF (Electrolytic capacitor) in parallel with a 0.1 µF capacitor at rated line voltage and load ranges.
5 When used in Cover Kit, de-rate output power to 70 % under all operating conditions.

## 2. INPUT SPECIFICATIONS

Specifications are for nominal input voltage, 25°C unless otherwise stated.

| PARAMETER | DESCRIPTION / CONDITION | SPECIFICATION |
|---|---|---|
| Input Voltage | Universal | 90 - 264 VAC |
| Input Frequency [6] | | 47 to 400 Hz |
| Input Current | 120 VAC:<br>230 VAC: | 0.85 A max.<br>0.45 A max. |
| No Load Power | Single output models<br>Multi output models | < 0.3 W<br>< 0.5 W |
| Inrush Current | 120 VAC:<br>230 VAC: | 30 A max.<br>60 A max. |
| Leakage Current | 120 VAC:<br>230 VAC: | < 140 µA<br><250 µA |
| Switching Frequency | Typical | 67 kHz |

6 Safety approved: 47 to 63 Hz

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## 3. OUTPUT SPECIFICATIONS

| PARAMETER | DESCRIPTION / CONDITION | SPECIFICATION |
|---|---|---|
| Efficiency [7] | Typical | 85% |
| Hold Up Time | @ 120 VAC typical | >10 ms |
| Output Power [8] | Derate output power linearly to 80% from 90 VAC to 80 VAC input. | 40 W |
| Line Regulation | | ± 0.3% |
| Load Regulation | V1:<br>V2 & V3: | ± 0.5%<br>± 5% |
| Transient Response | 50% to 100% load change, 50/60 Hz, 50% duty cycle, 0.1 A/µs | < 10%,<br>recovery time < 5 ms |
| Rise Time | | < 100 ms |
| Set Point Tolerance | V1:<br>V2 & V3: | ± 3%<br>± 5% |
| Output Voltage Adjustment | V1 | ± 10% |
| Over Current Protection | Typical above rating | 130% |
| Over Voltage Protection | Typical for V1 only | 130% |
| Short Circuit Protection | Short term, autorecovery | |
| Cooling | Convection | |

[7] For MBC40-3003G efficiency is 75% typical
[8] Derate output power linearly to 80% from 90 VAC to 80 VAC input.

## 4. ENVIRONMENTAL SPECIFICATIONS

| PARAMETER | DESCRIPTION / CONDITION | SPECIFICATION |
|---|---|---|
| Operating Temperature | Refer to derating curve, Fig. 1<br>-20 to 0°C start-up is guaranteed | -20 to 70°C |
| Storage Temperature | | -40 to +70°C |
| Relative Humidity | Non Condensing | 95% |
| Altitude | Operating:<br>Non-Operating: | 10,000 ft.<br>40,000 ft. |
| Reliability | MTBF according to Telcordia -SR332-Issue 3 | 1.87 million hours |

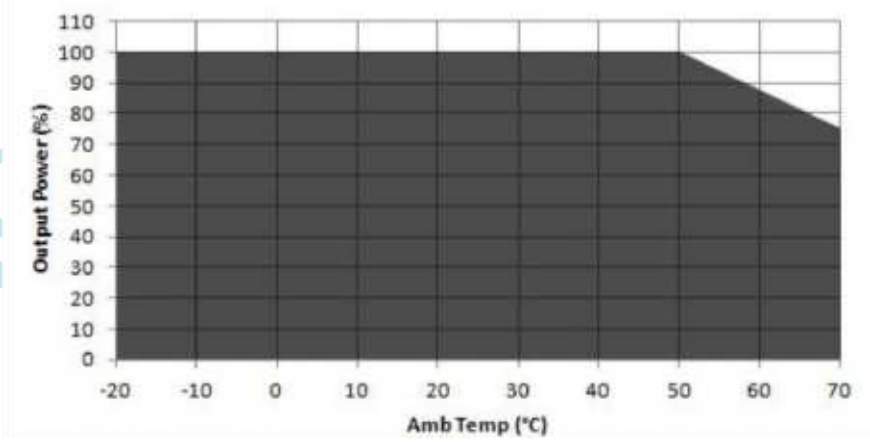



*Figure 1. Derating Curve*

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## 5. EMC SPECIFICATIONS

| PARAMETER | DESCRIPTION / CONDITION | SPECIFICATION |
|---|---|---|
| Conducted Emissions | EN 55011-B, CISPR22-B, FCC PART15-B | Pass |
| Radiated Emissions | EN 55011 B | Pass |
| Input Current Harmonics | EN 61000-3-2 | Class A |
| Voltage Fluctuation and Flicker | EN 61000-3-3 | Pass |
| ESD Immunity | EN 61000-4-2 | Level 4, Criterion A |
| Radiated Field Immunity | EN 61000-4-3 | Level 3, Criterion A |
| Electrical Fast Transient Immunity | EN 61000-4-4 | Level 3, Criterion A |
| Surge Immunity | EN 61000-4-5 | Level 3, Criterion A |
| Conducted Immunity | EN 61000-4-6 | Level 3, Criterion A |
| Magnetic Field Immunity | EN 61000-4-8 | Level 4, Criterion A |
| Voltage Dips, Interruptions | EN 61000-4-11 | Criterion A & B |

## 6. SAFETY SPECIFICATIONS

| PARAMETER | DESCRIPTION / CONDITION | SPECIFICATION |
|---|---|---|
| Isolation Voltage | Input to Output, 2M0PP<br>Input to Ground, 1M0PP<br>Output to Ground, 1M0PP | 4000 VAC<br>1500 VAC<br>500 VAC |
| Safety Standards | EN 60601-1, IEC 60601-1 (ed.3),<br>ANSI / AAMI ES 60601 - 1, CSA C22.2 No. 60601-1 | |
| Agency Approvals | Nemko, UL, C-UL | |
| CE mark | Complies with LVD Directive | |

## 7. CONNECTOR & PIN DESCRIPTION

| CONNECTOR | PIN | DESCRIPTION / CONDITION | | MANUFACTURER / PN |
|---|---|---|---|---|
| AC Input Connector | J1 | Pin 1<br>Pin 2 | AC Line<br>AC Neutral | Molex: 26-60-4030 or equivalent<br>Mating: 09-50-3031; Pins: 08-50-0106 |
| DC Output Connector | J2 | Pin 1,2<br>Pin 3,4<br>Pin 5<br>Pin 6 | V1<br>RTN<br>V3<br>V2 | Tyco: 640445-6 or equivalent<br>Mating: 647402-6; Pins: 3-647409-1 |
| Signal Connector | J3 | Pin 1<br>Pin 2 | +V1 Sense<br>-V1 Sense | Molex: 22-23-2021 or equivalent<br>Mating: 22-01-2021 |
| Earth (Spade Connector) | J4 | | | Molex: 19705-4301<br>Mating: 190030001 |

## 8. MECHANICAL SPECIFICATIONS

| PARAMETER | DESCRIPTION / CONDITION |
|---|---|
| Weight | 150 g (0.33 lbs.) |
| Dimensions | 101.6 x 50.8 x 30.48 mm (4 x 2 x 1.2 inch) |

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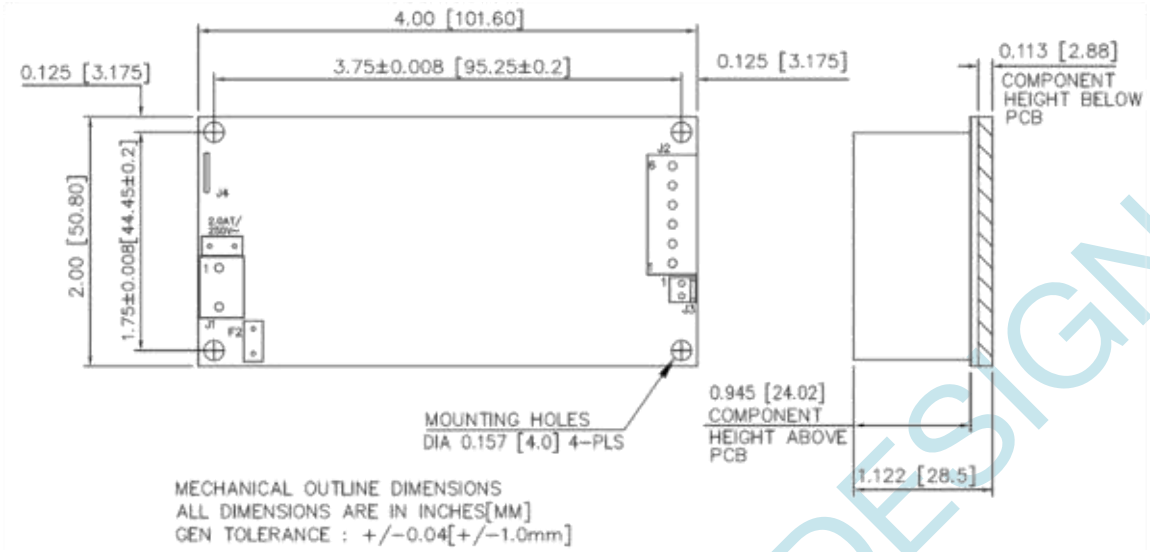



*Figure 2. Mechanical Drawing MBC40-1xxxG*

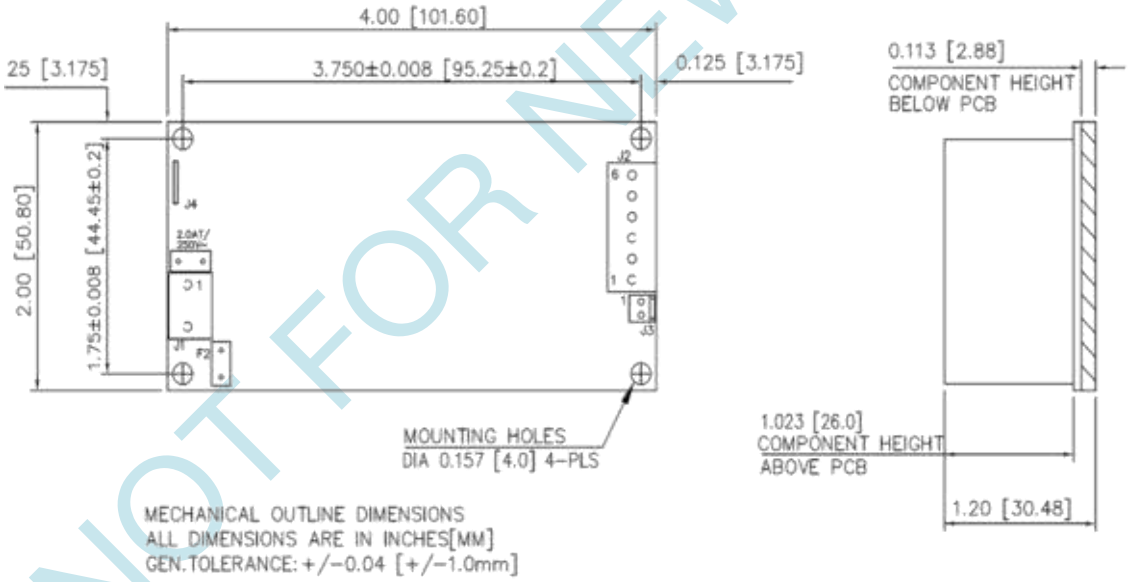



*Figure 3. Mechanical Drawing MBC40-3xxxG*

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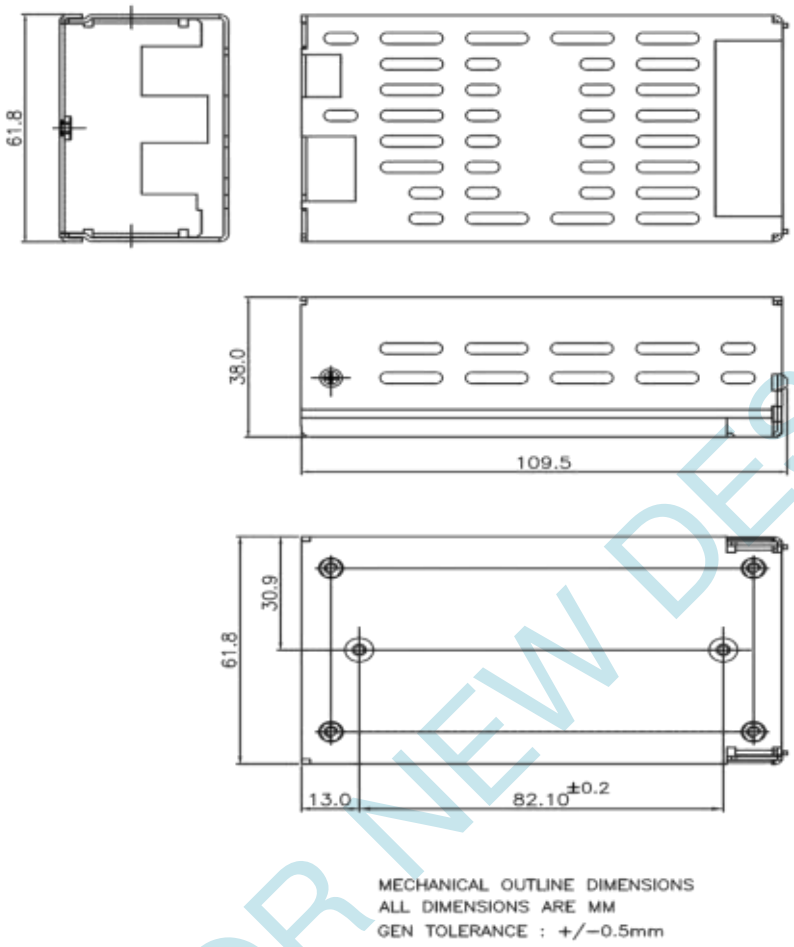



*Figure 4. Mechanical Drawing with Cover Kit*

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**NOTES:** In case the PCB is mounted in a metal enclosure, using metal hardware ensure the following:

1 Stand off, used to mount PCB has OD of 5.4 mm max.
2 Screws, used to fix PCB on stand off, have head dia of 6.0 mm max.
3 Washer, if used, to have dia of 6.5 mm max.

## For more information on these products consult: tech.support@psbel.com

**NUCLEAR AND MEDICAL APPLICATIONS** - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.
**TECHNICAL REVISIONS** - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.